DOCUMENT RESUME

ED 456 932 PS 029 785

AUTHOR Diffily, Deborah
TITLE Using Literature To Teach K-1 Math Concepts: An Annotated Bibliography and Suggested Extension Activities.
PUB DATE 2001-09-00
NOTE 17p.
PUB TYPE Guides - Non-Classroom (055) -- Reference Materials - Bibliographies (131)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Annotated Bibliographies; Books; *Childrens Literature; *Class Activities; Classroom Techniques; *Learning Activities; *Mathematical Concepts; *Mathematics Education; Primary Education

ABSTRACT

Noting that young children often need many experiences with a mathematical concept before they fully understand the concept, this annotated bibliography lists children's books for presenting mathematical concepts within a context and details activities that extend the text as a way to engage children in hands-on mathematical learning experiences. The bibliography focuses on 16 mathematics skills typically taught to 5- and 6-year-old children: one-to-one correspondence, counting, sorting and classifying, patterning, graphing, comparing quantities, estimating, adding, subtracting, multiplying and dividing, as well as concepts of parts and wholes/fractions, geometry, measurement, time, money, and number sense. (KB)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 456 932

USING LITERATURE TO TEACH K-1 MATH CONCEPTS: AN ANNOTATED BIBLIOGRAPHY AND SUGGESTED EXTENSION ACTIVITIES

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

by Deborah Diffily

Deborah Diffily

Early childhood educators know that children learn in different ways and that they often need many experiences with a concept before they truly understand that concept. This is especially true for mathematics.

Not all that long ago, mathematics was taught as isolated skills, practiced over and over. Memorization and calculation were prominent in math instruction. Now, it is more common to teach mathematics so that children are actively involved in the process, and skills are taught and learned in a context. Quality children's trade books are one way to present math concepts within a context, and activities that extend the text are one way to engage children in hands-on mathematical learning experiences. Below are listed 16 math skills typically taught to 5- and 6-year-old children: one-to-one correspondence, counting, sorting and classifying, patterning, graphing, comparing quantities, estimating, adding, subtracting, introduction to multiplication and division concepts, parts and wholes/fractions, geometry, measuring, time, money, and number sense. Children's books are recommended for each skill, and for each book, a brief summary and extension activites are provided.

PS 029785

BEST COPY AVAILABLE

One-to-One Correspondence

How Many Feet in the Bed? by Diane Johnston Hamm (Aladdin Paperbacks), 1994

Summary - This simple counting book counts by 2's as a little girl climbs into her parents' bed with her father: two people, four feet. As other family members join them in bed, the total number of feet reaches 10. As each family member climbs out of bed for various reasons, they count down to no feet in the bed, just one teddy bear.

Extension - Put a sheet in the middle of the circle. During a second read aloud, point to certain children to play the characters getting into and out of the bed. Have another child hold signs labeled, '2,' '4,' '6,' '8,' and '10,' and show the appropriate card that matches the number of feet in the bed at each point during the story.

Additional Extension - Ask children to volunteer to sketch the family getting into and out of the bed. Assist the children in posting the drawings in sequential order of 2 feet, 4 feet, 6 feet, 8 feet, 10 feet, 8 feet, 6 feet, 4 feet, 2 feet, and 0 feet.

The M&M's Counting Book by Barbara Barbieri McGrath (Charlesbridge), 1994

Summary - Using depictions of the candies and rhyming phrases, the beginning of the book can be used to teach the numbers 1 through 12. Following the counting portion of the book, the concepts of sets, shapes, and subtraction are introduced. Each page rearranges the M&M's.

Extension - Reproduce the counting pages of the book and provide M&M's so children can place M&M's on the pages of the book.

Counting

Let's Count by Tana Hoban (Greenwillow), 1999

Summary - Huge numerals with number words fill one page. The opposing page has a full-page photograph with a corresponding number of everyday objects – one chicken, two, ice cream cones, fifty eggs, one hundred spools of thread. Hoban does not cover all numbers, 1-100. She portrays numbers 1-15, 20, 30, 40, 50, and 100.

Extension - Create pages for a class-made book. It might be called, "Let's Count Stickers." Modeling for the class, write the numeral '1' and put one sticker on that page. Open the rings and add this page between the pre-prepared title page and back cover. On following days, create additional pages for the book. Each day, have the class choral read the book before placing it back in the Reading Center.

Additional Extension - Place blank books, markers, and stickers in the Writing Center or the Math Center so that children can choose to create their own copies of "Let's Count Stickers."

Spunky Monkeys on Parade by Stuart J. Murphy (HarperTrophy), 1999

Summary - Skip counting is encouraged in this book by counting the monkeys who are riding bicycles in pairs, cart wheeling in groups of three, and marching in groups of four.

Extension - Have children dramatize the action in the book, and chant the skip counting too.

Ten Sly Piranhas : A Counting Story in Reverse by William Wise (Dial Books), 1993

Summary - The title virtually tells the story. The book begins with 10 piranhas swimming in a river. By following the rhyming phrases and the humorous illustrations, the reader soon figures out that the piranhas are eating each other. The last of the fish is proud and boastful of his skills; however, a crocodile beats him at his own game.

Extension - Have children work together to make 10 fish and one large crocodile, and have them reinact the story as you read aloud.

Sorting and Classifying

The Button Box by Margarette S. Reid (Puffin), 1995

Summary - This simple little book shares the experience of a boy and his grandmother as they sort through the grandmother's collection of buttons.

Extension - Give each child 10-12 buttons in a small reclosable bag (for the first few times, ensure that each child gets the same set of buttons). Initially, ask the children to sort the buttons by a particular attribute, e.g. color, size, shape, number of holes, etc. After the children have had multiple experiences sorting buttons, the bags do not have to contain the same number or type of buttons and children may choose their own sorting attributes.

Additional Extension - Put a collection of buttons in the Math Center. Encourage a child who is struggling with the concept of sorting to find all the red buttons or all the buttons with one hole. Encourage children who are comfortable sorting by one or two attributes to choose their own sorting rules.

More or Less a Mess by Sheila Keenan (Scholastic), 1997

Summary - Told in rhyming phrases, this is the story of a little girl overwhelmed by the task of cleaning her room. First, she sorts her things by color, then by how she uses them, then by where they belong. But when she hears her mother coming up the stairs, she hides everything under her bed covers.

Extension - Read this story right before a "massive" clean-up time, i.e. at the end of the week. Talk about sorting items in the classroom and working together to put all items "where they belong."

Patterning

Beep, Beep, Vroom, Vroom! by Stuart J. Murphy (HarperCollins), 2000

Summary - Sibling rivalry is the basis for this book which teaches recognizing patterns. When Kevin leaves the room, his younger sister, Molly, play with his cars. He has told her not to touch his cars. He goes so far as to line up his red, blue, and yellow cars in a special pattern so he will know if anyone moves them. When anyone walks into the room, Molly lines the cars up. Each time, she uses a different pattern. That is, until Kevin walks back into the room and the cars are in the exact same order as he had left them.

Extension - Distribute reclosable bags that have been filled with 4 red, 4 blue, and 4 yellow 1" squares. Reread the story, using the 1" squares to represent the cars that Molly plays with and rearranges into different patterns. Pause in reading the story after each pattern and help children 'read' the pattern they've created.

Mou. Views: What the Class Pet Saw by Bruce McMillan (Holiday House), 1994

Summary - McMillan follows a class pet while he explores the school. McMillan shoots double photographs at several points during the mouse's journey through the school. The first photograph is shot very close, from the pet's point of view; the second, from a person's point of view. It is not always easy to identify some of the objects in the photos – a worn end of a piece of chalk, a stack of cafeteria trays, or piano keys in closeup. The photos clearly point out the intriguing patterns that can be found in everyday things.

Extension - Have children work in pairs to spy patterns on objects in the classroom. Borrowing enough magnifying glasses for each child – or at least, each pair – will add an element of "detective work" to the activity.

Graphing

The Best Vacation Ever by Stuart Murphy (HarperTrophy), 1997

Summary - The family does not agree about where to go on vacation, so the daughter of the family collects data and creates charts to help make this decision. Using math to solve this family problem is told through simple rhyming text.

Extension - Have children brainstorm a list of possible sites for a field trip. Write the field trip sites on a chart and have children vote to decide the favorite destination. If making this type of decision is not feasible in your school, have children collect data about a favorite place to go with mom or dad on a weekend day.

Comparing Quantities

Just Enough Carrots by Stuart J. Murphy (Harper Trophy), 1997

Summary - On a grocery shopping trip, the little rabbit compares the food in their shopping cart to the food in other shopping carts. He complains to his mother that they are not buying enough carrots and are definitely buying too many cans of worms.

Extension - Ask children to determine how many carrots would be "just enough" for everyone in the class to have 2 carrots (use any number of carrots, depending on the children's ability to work with larger numbers).

Estimating

Betcha! by Stuart J. Murphy (HarperCollins), 1997

Summary - Two friends read about a contest. The person who gets closest to the number of jelly beans in the jar wins two tickets to the All-Star Game. On their way to the toy store to estimate how many candies were in the jar, they estimate other things – the number of people on the bus, the number of cars in a traffic jam, the total prices of goods in a window. Each time they use a different

strategy to estimate. At the toy store, one of the friends wins the contest and the tickets.

Extension - Recreate the jelly bean estimation contest. Put a small jar filled with jellybeans in the Math Center, along with small slips of paper to record estimates and initials. During the next circle time, count the jellybeans together and determine who guessed the closest number.

Adding

Fish Eyes: A Book You Can Count On by Lois Ehlert (Voyager Books), 1992

Summary - Ehlert capitalizes on brightly-colored – almost neon – fish on the same deep blue background throughout the book. The first few pages are filled with fish which accompany a short poem, and the number of fish, 1-10, matches the numeral on each page. Accompanying each set of fish is a reoccurring dark green fish which challenges the child to add him to the set, thus encouraging the reader to add one to each number and predict the number of the next page.

Extension - Have a child (the line leader) go to the door. As he or she stands, the class calls out, "One." That child calls the name of another child and the class calls out, "Two." This is repeated until all children are in line. This activity supports children who are still developing the concept of rationale counting, as well as helping children understand the concept of +1.

One More Bunny: Adding from One to Ten by Rick Walton (HarperCollins), 2000

Summary - From the creators of So Many Bunnies, this counting book introduces bunnies and other "characters" such as bumblebees. The more readers look, the more they will find many different sets of objects and numbers to add.

Extension - Have children create one page of a class book entitled Counting Things in Our Classroom. Remind them to think about the book and draw a scene with things in the scene to count.

Subtracting

Five Little Monkeys Jumping on the Bed by Eileen Christelow (Clarion), 1990

Summary - This old rhyme has been made into a book. The story is the same. As soon as they say good night to their mother, all five monkeys start jumping on the bed. One by one, they fall off the bed and hurt themselves.

Extension - Let groups of 5 children dramatize the actions in the book by jumping on a sheet placed on the floor in the middle of the circle of children. Chant the rhyme as they jump and "fall off the bed" back into the circle.

Elevator Magic by Stuart J. Murphy (HarperTrophy), 1997

Summary - Ben and his mom take the elevator down from his mother's office. They make three stops on the way to the ground floor. Each time Ben uses the elevator buttons as a number line to figure out how many floors down they must go to reach their destinations.

Extension - Distribute long strips of paper (cut horizontally from 11" x 17" paper). Have children create their own line of elevator buttons. At the next circle time, have children use their elevator buttons to solve problems such as, "We are on the 9th floor. What floor will we be on if we go down three floors?"

Introduction to Multiplying/Dividing Concepts

The Doorbell Rang by Pat Hutchins (Mulberry Books), 1989

Summary - Ma baked a dozen cookies for her two children. They divided the cookies between them, but before they begin eating, the doorbell rings. Two neighborhood children had come to play. Now the cookies have to be divided two ways. The doorbell continues ringing. The cookies continue to be divided among more people until Grandma saves the day by arriving with her own tray of cookies.

Extension - Distribute large paper towels and reclosable bags with 12 cookies in each. During a second read aloud, have children divide their dozen cookies as new children come into the story.

Stay in Line by Teddy Slater (Scholastic), 1996

Summary - Twelve children take a class trip to the zoo. At first, they line up by 2s, then 3s, then 4s, even by 6s and finally 12s. Looking at different ways to group 12 introduces children to the concept of arrays, the basic concept of multiplication.

Extension - Have children reenact the grouping and regrouping that the children in the book do.

Parts and Wholes/Fractions

Eating Fractions by Bruce McMillan (Scholastic), 1991

Summary - Through photographs of two boys sharing different foods, McMillan demonstrates fractions. First showing the food as a whole (banana, muffins, pizza, corn on the cob, pear salad, and strawberry pie), subsequent photos show the food as it is cut into halves, quarters, and thirds. Recipes are included in the back of the book.

Extension - Have small groups of children decide which fraction they are going to use to divide their snack of bananas and muffins.

The Hershey's Milk Chocolate Bar Fraction Book by Jerry Pallotta and Robert C. Bolster (Cartwheel Books), 1999

Summary - The chocolate bar which is made up of 12 rectangles lends itself to exploring the concept of fractions. This book leads the reader through this exploration.

Extension - Use Hershey® bars as manipulatives – or same-size rectangles cut from brown card stock – and explore equivalent fractions such as six-twelfths equals one-half, and so on.

Geometry

A Cloak for the Dreamer by Aileen Friedman (Scholastic), 1995

Summary - Three sons of a tailor are given the task of creating a cloak for the Archduke. The first son creates his from rectangles. The second son creates two cloaks, one from squares, one from triangles. The third son creates his cloak from circles. Obviously, that cloak had holes in it and could not be given to the Archduke. The father and the first two sons stay up all night cutting the circles into hexagons and sewing a cloak for the third son. The water colored paintings feature the geometric shapes used to create the cloaks.

Extension - Use the four shapes used in this book – die-cut shapes – for children to create and recreate patterns.

Not Enough Room! by Joanne Rocklin (Scholastic), 1998

Summary - Two sisters have their own square room, that is, until a new baby comes into the family. They have to share a room. They try dividing it several different ways, but Mom is the one who comes up with the best idea: buy bunk beds and share the whole room.

Extension - Have small groups of children work together to measure tables or bookshelves, and have them attach tape to divide the furniture in half.

Measuring

How Big is a Foot? by Rolf Myller and Susan McCrath (Young Yearling), 1991

Summary - The King wants to give the Queen a bed for her birthday, but there is a problem. Beds had not been invented yet, so no one knows how long or wide to make a bed. How can the workers figure out how big to make the bed.

Extension - Ask children to measure their beds at home, bring the measurements to class, then "draw" their bed on the floor by using string that they measure.

Pigs go to the Market: Fun with Math and Shopping by Amy Axelrod (Aladdin Books), 1999

Summary - Grandma and Grandpa Pig agree to help with the Pig's family Halloween party. Instead of helping get ready for the party, they eat all the Halloween candy. The Pig family races to the grocery store where Mrs. Pig wins a 5-minute shopping spree. The candy aisle covers a two-page spread, complete with weights listed in both ounces and grams.

Extension - Have children bring in one item from the grocery store that lists its weight in both ounces and grams. Have children compare their items and sequence them from lightest to heaviest.

Time

The Grouchy Ladybug by Eric Carle (HarperCollins), 1996

Summary - Every hour, on the hour, a grouchy ladybug challenges an increasingly larger animal. "Hey, you wanna fight?" is the repeating phrase. The animals turn her down, that is, until she encounters a large whale.

Extension - Stop whatever the class is doing at the top of the hour. Ask the children to return to the meeting area and quickly create a page for a class book. Use sentences such as, "At 8:00, we were reading poetry," "At 9:00, we were working in centers," "At 10:00, we were writing our own stories," and so on.

Just a Minute by Teddy Slater (Scholastic), 1996

Summary - Fred just wants to show his new drawing to his family, but everyone he approaches says, "Just a minute."

Extension - Use a stopwatch as the "judge" of one minute. Lead the class in counting "one Mississippi, two Mississippi, three Mississippi, four Mississippi, five Mississippi, etc." to see if what the author said in the book about counting to "60 Mississippi" really takes 1 minute.

Money

Pigs Will be Pigs by Amy Axelrod (Aladdin Paperbacks), 1997

Summary - When the Pig family decides to go out to eat, Mr. Pig discovers he only has $1 in his wallet. The family hunts throughout their house to find enough to pay for their dinners. They finally find enough money to order the

specials from their favorite Mexican food restaurant (menu included in the book). The humorous illustrations are created in ink and acrylics and often mimic the round shapes of the pigs themselves.

Extension - Organize a money hunt within the classroom. Just as the Pig family hunted for money to buy dinner, children could hunt for money to purchase food, such as ice cream for dessert at lunch.

Penny Pot: Counting Coins by Stuart J. Murphy (Harper Trophy), 1998

Summary - Jessie and her friends learn about different ways to make fifty cents when they spend their time at a face painting booth. The story offers different opportunities to practice counting coins.

Extension - Give each child a small baggie with several coins. During a second read aloud, encourage the children to group some of their coins the same way that children in the story do.

Additional Extension - For children who have played "Race to 25" and understand it well, teach them to play "Race to 50." Place 50 pennies, 10 nickels, 5 dimes, one die, and one small plate in a reclosable bag, and put two or three of the game bags in the Math Center. The rules of the game are to roll the die and add that number of pennies to the player's plate. When the player accumulates 5 pennies, they can be exchanged for 1 nickel; 2 nickels can be exchanged for 1 dime; 2 dimes and 1 nickel exchanged for 1 quarter, and so on.

Number Sense

What Comes in 2's,3's, 4's? by Suzanne Aker (Aladdin Paperbacks), 1992

Summary - Focusing on the numbers in the title, this book goes beyond the typical counting book and examines familiar objects that are usually seen in pairs or in 3s or 4s.

Extension - Display three posterboards labeled '2,' '3,' and '4.' Ask children to add drawings or pictures cut out of magazines, catalogs, newspapers, or grocery circulars to represent what comes in that particular number. After children have become accustomed to this routine, add posterboard labeled with larger numbers.

12 Ways to Get to 11 by Eve Merriam (Aladdin Paperbacks), 1996

Summary - Merriam shows various combinations of objects that can be added together to reach the number 11. However, this is not a simple counting book where all objects on a page are identical. Objects are related in some way, but are not always obvious, e.g. on one page, tier reader counts 11 items that come out of the magician's hat: 4 banners, 5 rabbits, 1 pitcher of water, and 1 bouquet of flowers; on another page, the reader is to count 6 bites, 1 core, 1 stem, and 3 apple seeds to reach the number 11.

Extension - Encourage children to create their own pages of 11 related objects and bind the pages into a book.